

NOTE ON PILOTS' OBSERVATIONS OF AIR CURRENTS IN AND NEAR THUNDERSTORMS

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[Moline Airport, Ill.]

About 10 o'clock on the evening of September 10, 1928, an air-mail pilot took off from Moline Airport for Kansas City. Weather conditions were very much unsettled and thunderstorms were indicated over the route he was to follow. He found, however, that there was a ceiling of about 1,000 feet, fairly good visibility and very little rain, and he experienced no trouble until he was about 15 miles beyond Fairfield, Iowa. There he found that he was nearing a thunderstorm of considerable dimensions and decided to circumvent it, if possible. The storm was moving from the southwest and he elected to run along the northeastern edge, or forefront, of it, rather than to go so far out of his way by skirting the northern edge.

After following the new course for about 5 miles, he decided to start using gasoline from the other wing tank, and so leaned down in the cockpit to turn it on. While in that position the ship was suddenly thrown almost entirely over on its back and the altimeter showed 3,500 feet within about 20 seconds, according to the pilot's estimation. After righting the ship, the pilot returned to Moline Airport, judging that the storm he was near was of particular violence aloft and it would be foolhardy to continue. He stated that, since it was very dark, he could not tell whether the high altimeter reading was due to being lifted upward very rapidly or to suddenly lowered pressure of the atmosphere.

The turning over of the plane can be accounted for, as it is well known that there are rapidly ascending and descending currents in a thunderstorm. It is also known that the barometric pressure decreases sharply in the forefront of a thunderstorm and then increases rapidly as the storm passes over a given point, but if this sudden change of 2,500 feet (he was flying at about 1,000 feet) shown by the altimeter was due to a sharp lowering of pressure, the decrease would amount to not less than 65 millimeters, which is manifestly rather improbable, ex-

cept in the presence of tornadic conditions. Such conditions were very probable at that time when the distribution of several of the meteorological elements are taken into consideration. The 7 a. m. weather map for September 10, 1928, shows a long trough of low pressure stretching northeastward across the Plains States and that thunderstorms had already occurred over the western portions of this area. There is also a sharp variation of temperature shown from HIGH to LOW from east to west. These evidences, combined with the pilot's account that it occurred in the forefront of a thunderstorm, with no rain occurring before, seem to point to the probability of the presence of tornadic conditions.

On the other hand, if the altimeter change was due to an uprising current of air, the velocity of the current would have been approximately 38 meters per second; this seems rather high, although it corresponds very well with statements made by various pilots concerning the velocity of these currents and their effects upon an airplane.

Pilots who have been asked concerning experiences along this line are generally of the opinion that a violent uprising current of air in the front of the storm tossed the plane about and also lifted it very rapidly. Several stated that they have flown directly through thunderstorms and at the front of the storm have been struck by squalls which were made up of descending currents so violent that their utmost efforts were required to keep the ship from crashing, and after passing the front were lifted by the ascending currents into the clouds and could hardly get the plane down, even by pointing downward with the engine on.

The foregoing seems to indicate that in some thunderstorms the vertical air currents are much more violent than is generally supposed. Another inference would be that tornadic conditions may form aloft, of which no indication is perceived at the surface.

FIVE YEARS OF OCEAN MAPPING AND ITS FORECAST VALUE

By L. E. BLOCHMAN

[Berkeley, Calif.]

INTRODUCTION

Long-range, or seasonal, forecasting has so far been only cursorily investigated, particularly on the Pacific coast. Both short-range and long-range forecasting have been immensely assisted by ocean charting from daily radioed weather reports from ships. The main application of this service, however, is to daily or short-range forecasting; long-range forecasting is still in a tentative state for lack of sufficient data.

The ocean mapping system was not established without considerable difficulty. Credit is due to the San Francisco Weather Bureau service for its persistence in obtaining a sufficient number of ship reports to cover the desired ocean area. This extends from Honolulu to the westerly Aleutian Islands, and from this approximate westerly line to the Pacific coast of Canada and the United States on the east. The land stations of Guam, Manila, Hong Kong, St. Pauls Island in Bering Sea also report to the bureau.

As a layman I am studying prevalent seasonal conditions, especially the ocean movements of HIGHS and LOWS,

with their concomitant rains; the result of these studies is but partially embodied in this paper. In this article I also briefly discuss the recent ocean-mapped seasons, especially the very dry season of 1923-24 and the more than average rainy one of 1926-27, and some casual weather conditions of two other seasons.

THE SEMIPERMANENT LOWS AND HIGHS

In scanning our ocean and land maps for any series of years we find two dominant centers of pressure, the so-called semipermanent Aleutian LOW and the semipermanent HIGH which lies off the California coast about 15° to the west. The center of the Aleutian LOW is immediately south of the islands of the same name, but its center may vary for a thousand miles east or west.¹ The center of the semipermanent HIGH, above referred to,

¹ This apparent variation is explained by the fact that the so-called Aleutian cyclone owes its semipermanent character to the giving off of secondary depressions on its eastern front and receiving accessions from the west every few days. As a result the center of the cyclone seems to be stationary for a few days and then suddenly to change its position 500 to 1,000 miles to the westward.—Editor.